

IN THE CLAIMS

1. (currently amended) An apparatus comprising: The apparatus of claim 103, further comprising:

a local area network operably coupled to at least one positron emission tomography imaging system;

~~a dispensing station to receive a multidose vial of a radiotracer, and to dispense doses of the radiotracer to a plurality of positron emission tomography (PET) imaging systems, the dispensing station being operably coupled to the local area network to send over the local area network information regarding the doses dispensed to the plurality of PET imaging systems; and~~

~~a control the computer system operably coupled to the local area network to communicate with the plurality of at least one positron emission tomography imaging systems and the dispensing station.~~

2. (previously presented) The apparatus of claim 1, further comprising a quality control unit to monitor the radionuclic and chemical purity of the radiotracer that is dispensed by the dispensing station, the quality control unit conveying radiotracer quality information over the local area network.

3. (original) The apparatus of claim 1, wherein the local area network is further operably coupled to a radioisotope producer and wherein the dispensing station receives the radioisotope from the radioisotope producer.

4. (original) The apparatus of claim 3, wherein the radioisotope producer further comprises a cyclotron.

5. (original) The apparatus of claim 3, wherein the radioisotope producer further comprises a linear accelerator.

6. (original) The apparatus of claim 3, wherein the radioisotope producer further comprises a radioisotope generator.

7.- 8. (cancelled)

9. (currently amended) The apparatus of claim ~~4103~~, wherein the radiotracer further comprises nitrogen-13 ammonia.

10. (currently amended) The apparatus of claim ~~4103~~, wherein the radiotracer further comprises fluorodeoxyglucose.

11. (currently amended) The apparatus of claim ~~4103~~, wherein the ~~at least one positron emission tomography-imaging~~ system further comprises a plurality of positron emission tomography imaging systems.

12. (currently amended) The apparatus of claim ~~4103~~, wherein ~~the each positron-emission tomography-imaging system further comprises:~~

    a computer system having a graphical user interface operably coupled to the local area network;

    an injector system to extract at least one individual dose from the radiotracer and to inject the at least one individual dose into the living subject, the injector system being operably coupled to the local area network; and

    a physiologic monitoring system operably coupled to the injector system and operably coupled to the living subject.

13. (currently amended) The apparatus of claim ~~42103~~, wherein the ~~computer system calculates an amount of the each individual dose is-ealeulated-based on the radioactive half-life of the radiotracer, the projected time of injection into a living subject and high level descriptors of the living subject.~~

14. (original) The apparatus of claim 13, wherein the high level descriptors of the living subject further comprise the weight, sex and physical dimensions of the living subject.

15. – 24. (cancelled)

25. (currently amended) ~~The medical radiopharmaceutical administration system of claim 24, wherein The apparatus of claim 103, wherein the computer system calculates an amount of each-the individual dose is calculated-based on a type of radiopharmaceutical, a predefined parametric equation, clinical protocol being followed and high level descriptors of the living subject, wherein the high level descriptors of the living subject further comprise the weight, sex and physical dimensions of the living subject.~~

26. (currently amended) A portable medical radiopharmaceutical administration system comprising:

~~a local-area network operably coupled to a plurality of positron emission tomography imaging systems;~~

~~a dispensing station to receive a liquid radiopharmaceutical in quantities suitable for multiple doses of the radiopharmaceutical, and to dispense the radiopharmaceutical-to-the plurality of positron emission tomography imaging systems, the dispensing station being operably coupled to the local-area network, having a pump system and a liquid transfer path that is in fluid communication with the liquid radiopharmaceutical;~~

~~a quality control unit being operably coupled to the dispensing station;~~

~~an ion chamber to measure radioactivity, the ion chamber having an ion chamber inlet, through which the liquid entering the ion chamber, and a separate ion chamber outlet, from which the liquid exits the ion chamber;~~

~~a control system operably coupled to the local-area network, to receive status information from, and send commands to, the plurality of positron emission tomography imaging systems, the dispensing station, and the quality control unit, the pump system to withdraw an individual~~

dose from the multiple doses of the liquid radiopharmaceutical and move the individual dose along the liquid transfer path through the ion chamber inlet to the ion chamber, the ion chamber to measure a radioactivity of the individual dose in the ion chamber, the pump system to discharge the individual dose through the ion chamber outlet;

a radioactivity shield that surrounds portions of the medical radiopharmaceutical administration system that are radioactive; and

wheels mounted to the shield.

27. (currently amended) The portable medical radiopharmaceutical administration system of claim 26, wherein the portions of the system that are radioactive further comprise the dispensing station and the quality control unit ion chamber.

28. (currently amended) The portable medical radiopharmaceutical administration system of claim 26, wherein the further comprising local area network is further operably coupled to the control system and a radioisotope producer and wherein the dispensing station receives the liquid radiopharmaceutical from the radioisotope producer.

29. (currently amended) The portable medical radiopharmaceutical administration system of claim 2826, wherein the liquid transfer path includes a liquid transfer line, wherein the radioisotope producer further comprises a cyclotron at least a portion of the liquid transfer line is located within the ion chamber.

30. (currently amended) The portable medical radiopharmaceutical administration system of claim 2826, wherein the liquid transfer path includes a liquid transfer line, wherein the radioisotope producer further comprises a linear accelerator the liquid transfer line extends through the ion chamber between the ion chamber inlet and outlet.

31. (currently amended) The portable medical radiopharmaceutical administration system of claim 2826, wherein the radioisotope producer further comprises a radioisotope

generator wherein the pump system directs the individual dose in a single direction through the ion chamber.

32. (original) The portable medical radiopharmaceutical administration system of claim 26, wherein the radiopharmaceutical is selected from the group consisting of nitrogen-13, fluorine-18, carbon-11, oxygen-15 and rubidium-82.

33. (previously presented) The portable medical radiopharmaceutical administration system of claim 26, wherein each of the plurality of positron emission tomography imaging systems further comprises:

    a computer system having a graphical user interface operably coupled to the local area network;

    an injector system to extract at least one individual dose from the liquid radiopharmaceutical and to inject the at least one individual dose into the living subject, the injector system being operably coupled to the local area network; and

    a physiologic monitoring system operably coupled to the injector system and operably coupled to the living subject.

34. (original) The portable medical radiopharmaceutical administration system of claim 33, wherein the amount of each individual dose is calculated based on type of radiopharmaceutical, a predefined parametric equation, clinical protocol being followed and high level descriptors of the living subject, wherein the high level descriptors of the living subject further comprise the weight, sex and physical dimensions of the living subject.

35. (currently amended) A medical radiopharmaceutical administration system comprising:

    a local area network operably coupled to a plurality of positron emission tomography imaging systems;

    a dispensing station to receive a nitrogen-13 ammonia in quantities suitable for multiple doses of the nitrogen-13 ammonia, and to dispense the nitrogen-13 ammonia to the plurality of

positron emission tomography imaging systems, the dispensing station being operably coupled to the local area network;

a quality control unit to monitor the amount of radiochemical and the radionuclie purity of the nitrogen-13 ammonia that is dispensed by the dispensing station, the quality control unit being operably coupled to the local area network to convey quality information over the local area network; and

a control system operably coupled to the local area network, to communicate with the plurality of positron emission tomography imaging systems, the dispensing station, and the quality control unit; and

a plurality of delivery lines interconnected between the dispensing station and the plurality of PET imaging systems, the control system controlling dispensing of the individual doses over the delivery lines to the plurality of PET imaging systems.

36. (original) The medical radiopharmaceutical administration system of claim 35, wherein the local area network is further operably coupled to a radioisotope producer selecting from the group consisting of a cyclotron, and a linear accelerator, and wherein the dispensing station receives the nitrogen-13 ammonia from the radioisotope producer.

37. (original) The medical radiopharmaceutical administration system of claim 35, wherein the system further comprises being mounted on wheels.

38. (previously presented) The medical radiopharmaceutical administration system of claim 35, wherein the plurality of positron emission tomography imaging systems further comprises a plurality of positron emission tomography imaging systems, and wherein each of the plurality of positron emission tomography imaging systems further comprises:

a computer system having a graphical user interface operably coupled to the local area network;

an injector system to extract at least one individual dose from the nitrogen-13 ammonia and to inject the at least one individual dose into the living subject, the injector system being operably coupled to the local area network; and

a physiologic monitoring system operably coupled to the injector system and operably coupled to the living subject.

39. (original) The medical radiopharmaceutical administration system of claim 38, wherein the amount of each individual dose is calculated based on a predefined parametric equation, clinical protocol being followed and high level descriptors of the living subject, wherein the high level descriptors of the living subject further comprise the weight, sex and physical dimensions of the living subject.

40. (currently amended) A medical radiopharmaceutical administration system comprising:

a local area network operably coupled to a plurality of positron emission tomography imaging systems;

a dispensing station to receive liquid fluorodeoxyglucose in quantities suitable for multiple doses of the liquid fluorodeoxyglucose, and to dispense the fluorodeoxyglucose to the plurality of positron emission tomography imaging systems, the dispensing station being operably coupled to the local area network to send over the local area network information regarding the doses dispensed to the plurality of PET imaging systems; and

a control system operably coupled to the local area network, to receive status information from, and send commands to, the plurality of positron emission tomography imaging systems, the dispensing station, and the quality control unit; and

a plurality of delivery lines interconnected between the dispensing station and the plurality of PET imaging systems, the control system controlling dispensing of the individual doses over the delivery lines to the plurality of PET imaging systems .

41. (original) The medical radiopharmaceutical administration system of claim 40, wherein the local area network is further operably coupled to a cyclotron and wherein the dispensing station receives the liquid fluorodeoxyglucose.

42. (previously presented) The medical radiopharmaceutical administration system of claim 40, wherein the dispensing station is mounted on wheels.

43. (previously presented) The medical radiopharmaceutical administration system of claim 40, wherein the plurality of positron emission tomography imaging systems further comprises a plurality of positron emission tomography imaging systems, and wherein each of the plurality of positron emission tomography imaging systems further comprises:

    a computer system having a graphical user interface operably coupled to the local area network;

    an injector system to extract at least one individual dose from the liquid fluorodeoxyglucose and to inject the at least one individual dose into the living subject, the injector system being operably coupled to the local area network; and

    a physiologic monitoring system operably coupled to the injector system and operably coupled to the living subject.

44. (original) The medical radiopharmaceutical administration system of claim 43, wherein the amount of each individual dose is calculated based on a predefined parametric equation, clinical protocol being followed and high level descriptors of the living subject, wherein the high level descriptors of the living subject further comprise the weight, sex and physical dimensions of the living subject.

45. (currently amended) A medical radiopharmaceutical administration system comprising:

    a local area network operably coupled to a plurality of positron emission tomography (PET) imaging systems;

a dispensing station to receive a liquid radiotracer in quantities suitable for multiple doses of a radiopharmaceutical, and to dispense the radiopharmaceutical to the plurality of positron emission tomography imaging systems, the dispensing station being operably coupled to the local area network to send over the local area network information regarding the doses dispensed to the plurality of PET imaging systems;

a quality control unit to monitor the amount of radio and the radionuclic purity of the radiopharmaceutical that is dispensed by the dispensing station, the quality control unit being operably coupled to the local area network and operably coupled to the dispensing station; and

a control system operably coupled to the local area network, to receive status information from, and send commands to, the plurality of positron emission tomography imaging systems, the dispensing station, and the quality control unit; and

a plurality of delivery lines interconnected between the dispensing station and the plurality of PET imaging systems, the control system controlling dispensing of the individual doses over the delivery lines to the plurality of PET imaging systems.

46. (original) The medical radiopharmaceutical administration system of claim 45, wherein the local area network is further operably coupled to a cyclotron and wherein the dispensing station receives the liquid radiopharmaceutical from the cyclotron.

47. (previously presented) The medical radiopharmaceutical administration system of claim 45, wherein the dispensing station is mounted on wheels.

48. (original) The medical radiopharmaceutical administration system of claim 45, wherein a radioactivity shield surrounds portions of the system that are radioactive.

49. (original) The medical radiopharmaceutical administration system of claim 45, wherein the radiotracer further comprises nitrogen-13 ammonia.

50. (original) The medical radiopharmaceutical administration system of claim 45, wherein the radiotracer further comprises fluorodeoxyglucose.

51. (original) The medical radiopharmaceutical administration system of claim 45, wherein each of the plurality of positron emission tomography imaging systems further comprises:

    a computer system having a graphical user interface operably coupled to the local area network;

    an injector system to extract at least one individual dose from the liquid radiopharmaceutical and to inject the at least one individual dose into the living subject, the injector system being operably coupled to the local area network; and

    a physiologic monitoring system operably coupled to the injector system and operably coupled to the living subject.

52. (original) The medical radiopharmaceutical administration system of claim 51, wherein the amount of each individual dose is calculated based type of radiopharmaceutical, a predefined parametric equation, clinical protocol being followed and high level descriptors of the living subject.

53. (original) The medical radiopharmaceutical administration system of claim 52, wherein the high level descriptors of the living subject further comprise the weight, sex and physical dimensions of the living subject.

54. (original) The medical radiopharmaceutical administration system of claim 45, further comprising a chemical synthesizer operably coupled to the dispensing station, to receive a radioisotope, and to produce a radiotracer, and to transfer the radiotracer to the dispensing station.

55. (currently amended) A radiopharmaceutical administration system comprising:

    a local area network operably coupled to a plurality of positron emission tomography (PET) imaging systems;

a dispensing station to receive a liquid radiopharmaceutical in quantities suitable for multiple doses of the radiopharmaceutical, and to dispense the radiopharmaceutical to the plurality of positron emission tomography imaging systems, the dispensing station being operably coupled to the local area network to send over the local area network information regarding the doses dispensed to the plurality of PET imaging systems;

a quality control unit, to monitor the amount of radiochemical and the radionuclic purity of the radiopharmaceutical that is dispensed by the dispensing station, the quality control unit being operably coupled to the local area network to send quality information over the local area network; and

a control system operably coupled to the local area network, to receive status information from, and send commands to, the plurality of positron emission tomography imaging systems, the dispensing station, and the quality control unit; and

a plurality of delivery lines interconnected between the dispensing station and the plurality of PET imaging systems, the control system controlling dispensing of the individual doses over the delivery lines to the plurality of PET imaging systems;

wherein each of the plurality of positron emission tomography imaging systems further comprises:

a computer system having a graphical user interface operably coupled to the local area network;

an injector system to extract at least one individual dose from the liquid radiopharmaceutical and to inject the at least one individual dose into the living subject, the injector system being operably coupled to the local area network; and

a physiologic monitoring system operably coupled to the injector system and operably coupled to the living subject.

56. (original) The radiopharmaceutical administration system of claim 55, wherein the local area network is further operably coupled to a cyclotron and wherein the dispensing station receives the liquid radiopharmaceutical from the cyclotron.
57. (previously presented) The radiopharmaceutical administration system of claim 55, wherein the dispensing station is mounted on wheels.
58. (original) The radiopharmaceutical administration system of claim 55, wherein the radiotracer further comprises being selected from the group consisting of nitrogen-13 ammonia and fluorodeoxyglucose.
59. (original) The radiopharmaceutical administration system of claim 55, wherein the amount of each individual dose is calculated based on type of radiopharmaceutical, a predefined parametric equation, clinical protocol being followed and high level descriptors of the living subject.
60. (original) The radiopharmaceutical administration system of claim 59, wherein the high level descriptors of the living subject further comprise the weight, sex and physical dimensions of the living subject.
61. (currently amended) A medical radiopharmaceutical administration system comprising:
  - a local area network operably coupled to a plurality of positron emission tomography (PET) imaging systems;
  - a dispensing station to receive a liquid radiopharmaceutical in quantities suitable for multiple doses of the radiopharmaceutical, and to dispense the radiopharmaceutical to the plurality of positron emission tomography imaging systems, the dispensing station being operably coupled to the local area network to send over the local area network information regarding the doses dispensed to the plurality of Pet imaging systems;
  - a quality control unit, to monitor the amount of radiochemical and the radionuclie purity of the radiopharmaceutical that is dispensed by the dispensing station, the quality control unit

being operably coupled to the local area network and operably coupled to the dispensing station; and

a control system operably coupled to the local area network, to receive status information from, and send commands to, the plurality of positron emission tomography imaging systems, the dispensing station, and the quality control unit; and

a plurality of delivery lines interconnected between the dispensing station and the plurality of PET imaging systems, the control system controlling dispensing of the individual doses over the delivery lines to the plurality of PET imaging systems;

wherein each of the plurality of positron emission tomography imaging systems further comprises:

a computer system having a graphical user interface operably coupled to the local area network;

an injector system to extract at least one individual dose from the liquid radiopharmaceutical and to inject the at least one individual dose into the patient, the injector system being operably coupled to the local area network; and

a physiologic monitoring system operably coupled to the injector system and operably coupled to the patient.

62. (original) The medical radiopharmaceutical administration system of claim 61, wherein the local area network is further operably coupled to a cyclotron and wherein the dispensing station receives the liquid radiopharmaceutical from the cyclotron.

63. (previously presented) The medical radiopharmaceutical administration system of claim 61, wherein the radiopharmaceutical is selected from a group consisting of nitrogen-13, fluorine-18, carbon-11, oxygen-15 and rubidium-82.

64. (original) The medical radiopharmaceutical administration system of claim 61, wherein the amount of each individual dose is calculated based on type of radiopharmaceutical, a

predefined parametric equation, clinical protocol being followed and high level descriptors of the patient, and wherein the high level descriptors of the patient further comprise the weight, sex and physical dimensions of the patient.

65. (currently amended) A system comprising:

a local area network operably coupled to a plurality of positron emission tomography (PET) imaging systems;

apparatus operable to dispense a radiopharmaceutical to the plurality of positron emission tomography (PET) imaging systems, the apparatus operable to dispense being operably coupled to the local area network to send over the local area network information regarding the doses dispensed to the plurality of PET imaging systems;

apparatus operable to monitor the quality of the radiopharmaceutical that is dispensed by the apparatus operable to dispense, the apparatus operable to monitor being operably coupled to the local area network and operably coupled to the apparatus operable to dispense;

apparatus operable to receive status information from the plurality of positron emission tomography imaging systems, the apparatus operable to dispense, and the apparatus operable to monitor, the apparatus operable to receive being operably coupled to the local area network; and

apparatus operable to send commands to the plurality of positron emission tomography imaging systems, the apparatus operable to dispense and the apparatus operable to monitor, the apparatus operable to send being operably coupled to the local area network; and

a plurality of delivery lines interconnected between the dispensing station and the plurality of PET imaging systems, the apparatus operable to dispense controlling dispensing of the individual doses over the delivery lines to the plurality of PET imaging systems.

66. (previously presented) An apparatus comprising:

a computer system having a graphical user interface;

a dispensing station operable to extract individual doses from a multidose vial of a radiopharmaceutical and dispense the individual doses to a plurality of positron emission tomography (PET) imaging systems;

an injector operable to inject the individual doses into a patient, the injector system being operably coupled to the computer system; and

a plurality of delivery lines interconnected between the dispensing station and the plurality of PET imaging systems, the computer system controlling dispensing of the individual doses over the delivery lines to the plurality of PET imaging systems.

67. (original) The apparatus of claim 66, wherein the computer system receives data from the physiologic monitoring system, the injector system, a keyboard and the graphical user interface, and sends commands to the injector system.

68. (original) The apparatus of claim 66, wherein the amount of each individual dose is calculated based on the radioactive half-life of the radiopharmaceutical, the projected time of injection into a living subject and high level descriptors of the patient.

69. (original) The apparatus of claim 66, wherein the high level descriptors of the living subject further comprise the weight, sex and physical dimensions of the patient.

70. (currently amended) ~~A positron emission tomography~~ An imaging system comprising:  
an injector;

a multi-dose container to hold a multi-dose quantity of liquid radiopharmaceutical;

a dispensing station operable to extract individual doses of a radiopharmaceutical from the multi-dose container and distribute each individual dose to the injector and operably coupled to a plurality of positron emission tomography imaging systems ~~an imaging system~~, the dispensing station being mounted on wheels to be movable ~~between the plurality of PET~~ to and from the imaging systems;

an ion chamber to measure radioactivity therein, the ion chamber fluidly coupled to the dispensing station;

a physiologic monitor operably coupled to the injector; and

a positron-emission-tomography-an imaging scanner operably coupled to the physiologic monitor and the injector; and

a computer system provided on the wheels, the computer system to calculate a target dosage for an individual dose based on at least one of a half-life of the pharmaceutical and a weight of the living subject, the computer system to control the dispensing station to withdraw an amount from the multi-dose container based on the target dosage and move the amount to the ion chamber, the ion chamber to measure a radioactivity of the amount in the ion chamber, the computer system to compare a measurement from the ion chamber to the target dosage to determine whether the amount in the ion chamber corresponds to the target dosage, the computer system to control the dispensing station to discharge the amount as an individual dose when the measurement from the ion chamber corresponds to the target dosage.

71. (currently amended) The positron-emission-tomography-imaging system of claim 70, wherein the injector is operable to inject individual doses of a radiopharmaceutical into a patient.

72. (currently amended) The positron-emission-tomography-imaging system of claim 70, wherein the radiotracer further comprises nitrogen-13 ammonia.

73. (currently amended) The positron-emission-tomography-imaging system of claim 70, wherein the radiotracer further comprises fluorodeoxyglucose.

74. (currently amended) The positron-emission-tomography-imaging system of claim 70, wherein the physiologic monitor is operably to monitor blood pressure and heart activity.

75. (currently amended) The positron-emission-tomography-imaging system of claim 70, wherein the operable coupling is provided by a local area network.

76. (currently amended) The positron-emission-tomography-imaging system of claim 70, further comprising ~~wherein the~~ computer system operably coupled to the local-area network, to ~~control~~control dispensing and injection of ~~an~~the individual dose of a radiopharmaceutical into ~~a~~the living subject and ~~to~~controlcontrol radiological scanning of the living subject.

77. – 86. (cancelled)

87. (currently amended) The portable system of claim 10386, wherein the ~~computer system~~dose calibrator verifies an adequacy of the individual dose prior to injection.

88. (currently amended) The portable system of claim 10386, wherein the ~~computer system~~dose calibrator calculates a dosage for an individual dose based on at least one of a half-life of the pharmaceutical and a weight of the living subject.

89. (currently amended) The portable system of claim 10386, wherein the dispensing station includes an extractor to extract the doses from the multi-dose container holding the multi-dose quantity, the dose calibrator to measure the radioactivity of the doses when extracted.

90. (currently amended) The portable system of claim 10386, further comprising ~~a~~wherein the computer system ~~to~~calculates an individual dose based on at least one of a weight and sex of a living subject, wherein the dispensing station comprises an extractor that extracts ~~the dose~~an amount of the radiopharmaceutical ~~that is reasonably expected to~~ corresponding to the individual dose of the radiopharmaceutical.

91. (currently amended) The portable system of claim 10386, further comprising ~~a~~wherein the computer system ~~having~~has a graphical user interface operably coupled to the dispensing station ~~and dose calibrator~~, the computer system recording the individual doses delivered to living subjects.

92. (currently amended) The portable system of claim 10386, further comprising ~~a~~wherein the computer system ~~having~~has a graphical user interface operably coupled to the dispensing

station-and-dose calibrator, the computer system calculating an individual dose based on a weight of the living subject.

93. (currently amended) The portable system of claim 10392, wherein the computer system calculates an amount of dose radioactivity for the individual dose, the dispensing station comprising an extractor that extracts an amount of the radiopharmaceutical from the multidose container until the ion chamber dose calibrator measures an amount of extracted radioactivity that corresponds to the desired amount of dose radioactivity calculated by the computer system.

94. (currently amended) The portable system of claim 10386, further comprising a wherein the computer system stored having a graphical user interface operably coupled to the dispensing station-and-dose calibrator, the computer system storing at least one of dosing data and an initial dose activity at an initial time.

95. (currently amended) The portable system of claim 86104, further comprising a quality control unit provided within the radioactivity shielding on the moveable structure, the quality control unit being operably coupled to the dispensing station, the quality control unit monitoring a radioactivity of the liquid radiopharmaceutical prior to being dispensed by the dispensing station.

96. (currently amended) The portable system of claim 8695, wherein the quality control unit monitors at least one of an amount, quality and quantity of the radioactivity.

97. (currently amended) The portable system of claim 8695, wherein the quality control unit performs the monitoring at particular time intervals.

98. (currently amended) The portable system of claim 8695, wherein the quality control unit performs the monitoring for a production batch of the radiopharmaceutical.

99. (currently amended) The portable system of claim 8695, wherein the quality control unit calculates an amount of radioactivity based on at least one of a half-life of the radiopharmaceutical and an amount of time lapsed since production of the radiopharmaceutical.

100. (currently amended) The portable system of claim 10486, further comprising a communications device provided on the moveable structure to communicate over a link with a remote computer, the communications device conveying at least one of status information, commands, dosage information, and dose production information.

101. (currently amended) The portable system of claim 86103, wherein the liquid transfer line path includes tubing that is lead-shielded.

102. (cancelled)

103. (new) A portable medical radiopharmaceutical administration system comprising:

    a moveable structure mounted on wheels to be moveable in a medical facility to and from an imaging system, the moveable structure including radioactivity shielding;

    a multi-dose container to hold a multi-dose quantity of liquid radiopharmaceutical;

    a dispensing station to receive the multi-dose container, the dispensing station having a pump system and a liquid transfer path that is in fluid communication with the multi-dose quantity;

    an ion chamber to measure radioactivity, the ion chamber having an ion chamber inlet and an ion chamber outlet, the liquid transfer path entering ion chamber at the ion chamber inlet, the liquid transfer path exiting the ion chamber at the ion chamber outlet;

    wherein the multi-dose container, the dispensing station, and the ion chamber are enclosed within the radioactivity shielding while moved on the moveable structure to and from the imaging system; and

    a computer system provided on the moveable structure and operably coupled to the pump system and the ion chamber, the pump system to withdraw an individual dose from the multi-dose container and move the individual dose along the liquid transfer path through the ion chamber inlet to the ion chamber, the ion chamber to measure a radioactivity of the individual

dose in the ion chamber, the pump system to move the individual dose out of the ion chamber outlet along the liquid transfer path for injection to a patient.

104. (new) A portable medical radiopharmaceutical administration system comprising:

a moveable structure mounted on wheels to be moveable to and from an imaging system, the moveable structure including radioactivity shielding;

a multi-dose container to hold a multi-dose quantity of liquid radiopharmaceutical;

a dispensing station to receive the multi-dose container, the dispensing station having a pump system;

an ion chamber to measure radioactivity therein, the ion chamber being fluidly coupled to the multi-dose container, wherein the multi-dose container, the dispensing station, and the ion chamber are enclosed within the radioactivity shielding while moved on the moveable structure to and from the imaging system; and

a computer system provided on the moveable structure, the computer system to calculate a target dosage for an individual dose based on at least one of a half-life of the pharmaceutical and a weight of the living subject, the computer system to control the pump system to withdraw an amount from the multi-dose container based on the target dosage and move the amount to the ion chamber, the ion chamber to measure a radioactivity of the amount in the ion chamber, the computer system to compare a measurement from the ion chamber to the target dosage to determine whether the amount in the ion chamber corresponds to the target dosage, the computer system to control the pump system to discharge the amount as an individual dose when the measurement from the ion chamber corresponds to the target dosage.

105. (new) The portable system of claim 103, wherein the liquid transfer line is configured to be coupled to an injection apparatus to dispense individual doses of the radiopharmaceutical.

106. (new) The portable system of claim 103, wherein the liquid transfer path includes a continuous fluid path through the ion chamber.

107. (new) The portable system of claim 103, wherein the pump system directs the individual dose along the liquid transfer path in a single direction through the ion chamber.

108. (new) The portable system of claim 103, wherein the computer system controls the pump system to extract an amount of the radiopharmaceutical from the multi-dose container into the ion chamber, wherein the amount extracted is reasonably calculated to provide the individual dose, the computer system to determine whether a radioactivity of the amount in the ion chamber corresponds to a requested amount of radioactivity.

109. (new) The portable system of claim 103, wherein the computer system obtains a target dosage and determines whether the individual dose corresponds to the target dosage immediately prior to injection while in close proximity to a site of injection proximate the imaging system.

110. (new) The portable system of claim 103, wherein the computer system calculates a target dosage for the individual dose based on at least one of a half-life of the pharmaceutical and a weight of the living subject, and compares a measurement from the ion chamber to the target dosage to determine whether the individual dose in the ion chamber is adequate.

111. (new) The portable system of claim 103, wherein the liquid transfer path includes a liquid transfer line, wherein at least a portion of the liquid transfer line is located within the ion chamber.

112. (new) The portable system of claim 103, wherein the liquid transfer path includes a liquid transfer line, wherein the liquid transfer line extends through the ion chamber between the ion chamber inlet and outlet.

113. (new) The portable system of claim 103, wherein the pump system directs the individual dose in a single direction through the liquid transfer path.